WE CLAIM:

1. A computer implemented method for automatically generating a process animation, comprising the steps of:

(a) obtaining three-dimensional data of a product consisting of a plurality of parts;

(b) generating disassembly definition information for disassembling said product into parts thereof according to a user entry;

(c) generating a disassembly algorithm for the parts of said product according to said disassembly definition information, and storing said disassembly algorithm in a memory; and

(d) generating a disassembly animation of the parts of said product according to said disassembly algorithm.

2. The method of Claim 1, wherein

said disassembly definition information is the definition information of dependency relationships among parts and group relationships among groups, and comprises a tree structure consisting of nodes and leaves, which are processes and parts, respectively, wherein each of said nodes comprises a basic process and an intermediate process performed in the basic process, and wherein each of said leaves consists of a process parts group for grouping a plurality of parts or parts groups, and said parts or parts groups.

3. The method of Claim 2, wherein

said step (c) generates said disassembly algorithm by adding to said disassembly definition information, a moving coordinate system of said basic process and said intermediate process, and a moving position of the parts or parts groups and the process parts group along said moving coordinate system, that are determined based on said disassembly definition information.

4. The method of Claim 3, wherein

in said step (c), as for said moving coordinate system, the coordinate system of a

part or parts group that forms the base of said basic process is selected as the coordinate system of the basic process or the intermediate process.

5. The method of Claim 3, wherein

in said step (c), a shape of each of the parts or parts groups is approximated with a circumscribing polygon thereof, and the moving position is set such that each polygon is at a minimum distance from each other which is greater than a predetermined ratio.

6. The method of Claim 2, wherein

said step (d) generates a movement animation for parts or parts groups in each process for each of the basic process and the intermediate process based on the following parameters:

an animation length,

an interpolation system for between a start and an end point, and

a disassembly coefficient for determining a disassembly moving distance;

and generates an entire animation by sequentially connecting said each animation according to said disassembly algorithm.

7. The method of Claim 6, wherein

said step (d) further generates an animation for each of the basic process or the intermediate process by adding camera view point information.

8. The method of Claim 6, wherein

said step (d) further comprises the steps of creating a waiting time animation for between said movement animations or between processes, and inserting said waiting time animation between predetermined movement animations selected from said movement animations.

9. The method of Claim 6, wherein

said step (d) further comprises the steps of taking a snapshot at start and end times of said movement animation to generate an initialization animation, respectively,

and inserting said respective initialization animation at start and end points of said each movement animation.

10. The method of Claim 1 further comprises the step of:

(e) modifying said disassembly algorithm and said disassembly animation after said animation or an entire animation is generated.

11. The method of Claim 10, wherein

said step (e) modifies the movement animation of each process by modifying a position, a bearing or a scale of each of the parts or parts groups for each animation created for each of the basic process, the intermediate process and the processes connecting the basic and intermediate processes, wherein the basic, intermediate and connecting processes constitute the disassembly definition information.

12. The method of Claim 11, wherein

said step (e) generates and presents a user interface for modifying the position, bearing or scale for each of said parts or parts groups.

13. The method of Claim 11, wherein

when said step (e) modifies one animation, step (e) also modifies animations of other processes, that are performed within the process corresponding to said one animation, by modifying a position, a bearing or a scale of each of the parts or parts groups in each of those other processes based on said disassembly algorithm.

14. The method of Claim 11, wherein

said step (e) further permits modification of camera view point information for each animation to modify each animation.

15. The method of Claim 11, wherein

said step (e) modifies each movement animation in each process by determining an interference among said parts or parts groups during movements thereof for each animation created for each of the basic processes, intermediate processes, and the processes that connect the basic and intermediate processes, wherein the basic, intermediate and connecting processes constitute said disassembly definition information;

and modifying the position, bearing or scale for each of the parts or parts groups in each animation.

16. The method of Claim 15, wherein

said interference among said parts or parts groups during the movements thereof is determined by calculating the interference among respective polygons circumscribed around each of said parts or parts groups.

17. A system for automatically generating a process animation, comprising:

(a) a three-dimensional graphic data obtaining unit for obtaining three-dimensional graphic data of a product consisting of a plurality of parts;

(b) a disassembly definition information generation unit for generating disassembly definition information for disassembling said product into parts thereof according to a user entry;

(c) a disassembly algorithm generation unit for generating a disassembly algorithm for the part of said product according to said disassembly definition information, and

(d) a disassembly animation generation unit for generating a disassembly animation of the parts of said product according to said disassembly algorithm.

18. The system of Claim 17, wherein

said disassembly definition information is the definition information of dependency relationships among parts and group relationships among groups, and comprises a tree structure consisting of nodes and leaves, which are processes and parts, respectively, wherein each of said nodes comprises a basic process and an intermediate process performed in the basic process, and wherein each of said leaves consists of a process parts group for grouping a plurality of parts or parts groups, and said parts or parts groups.

19. The system of Claim 18, wherein

said disassembly algorithm generation unit generates said disassembly algorithm by adding to said disassembly definition information, a moving coordinate system of said

basic process and said intermediate process, and a moving position of the parts or parts groups and the process parts group along said moving coordinate system, that are determined based on said disassembly definition information.

20. The system of Claim 19, wherein

said disassembly algorithm generation unit selects the coordinate system of a part or parts group that forms the base of said basic process as the coordinate system of the basic process or the intermediate process.

21. The system of Claim 19, wherein

said disassembly algorithm generation unit approximates a shape of each of the parts or parts groups with a circumscribing polygon thereof, and the moving position is set such that each polygon is at a minimum distance from each other which is greater than a predetermined ratio.

22. The system of Claim 18, wherein

said disassembly animation generation unit generates a movement animation for parts or parts groups in each process for each of the basic process and the intermediate process based on the following parameters:

an animation length,

an interpolation system for between a start and an end point, and

a disassembly coefficient for determining a disassembly moving distance;

and generates an entire animation by sequentially connecting said each animation according to said disassembly algorithm.

23. The system of Claim 22, wherein

said disassembly animation generation unit further generates an animation for each of the basic process or the intermediate process by adding camera view point information.

24. The system of Claim 22, wherein

said disassembly animation generation unit further comprises the step of creating

a waiting time animation for between said movement animations or between processes, and inserting said waiting time animation between predetermined movement animations selected from said movement animations.

25. The system of Claim 22, wherein

said disassembly animation generation unit further comprises the step of taking a snapshot at start and end times of said movement animation to generate an initialization animation, respectively, and inserting said respective initialization animation at start and end points of said each movement animation.

26. The system of Claim 17, further comprising:

(e) modifying said disassembly algorithm and said disassembly animation after said animation or an entire animation is generated.

27. The system of Claim 26, wherein

said animation modification unit modifies the movement animation of each process by modifying a position, a bearing or a scale of each of the parts or parts groups for each animation created for each of the basic process, intermediate process and processes connecting the basic and intermediate processes, wherein the basic, intermediate and connecting processes constitute the disassembly definition information.

28. The system of Claim 27, wherein

said animation modification unit generates and presents a user interface for modifying the position, bearing or scale for each of said parts or parts groups.

29. The system of Claim 27, wherein

when said animation modification unit modifies one animation, said animation modification unit also modifies animations of other processes, that are performed within the process corresponding to said one animation, by modifying a position, a bearing or a scale of each of the parts or parts groups in each of those other processes based on said disassembly algorithm.

30. The system of Claim 27, wherein

said animation modification unit further permits modification of camera view

point information for each animation to modify each animation.

31. The system of Claim 27, wherein

said animation modification unit modifies each movement animation in each process by determining an interference among said parts or parts groups during movements thereof for each animation created for each of the basic processes, intermediate processes, and the processes that connect the basic and intermediate processes, wherein the basic, intermediate and connecting processes constitute said disassembly definition information; and modifying the position, bearing or scale for each of the parts or parts groups in each animation.

32. The system of Claim 31, wherein

said interference among said parts or parts groups during the movements thereof is determined by calculating the interference among respective polygons circumscribed around each of said parts or parts groups.